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Abstract

DEVELOPMENT OF HEAT-RESISTANT FUEL ELEMENTS WITH MAGNESIUM-BERYLLIUM CANNINGS

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It has been established earlier[1] that magnesium-beryllium alloys with a higher against the dissolubility limit, content of beryllium are a promising material for atomic engineering. The report is devoted to the development of industrial methods of magnesium - beryllium alloy production and the study of the alloy properties.

The report discusses the following problems:

1) Development of techniques for the fabrication of magnesium-berillium alloys by powder metallurgy.

2) Structural features of alloys. Resistance to integrating recrystallization. Formation of intermetallic compound $MgBe_{13}$.

3) Strength characteristics of alloys in the range from 20 to 550°C. Specific features of reinforced state. Effect of chemical composition, temperature and rate of deformation on the plasticity of alloys. Margins of alloy plasticity. Kinetics and destructive properties

1) Application of a Mg-Be alloy as a material for gas-cooled reactors. Report by K.D.Sinelnikov, V.E.Ivanov and V.F.Zelensky at the 2nd Conference in 1958.

"High-temperature oxidation of Mg-Be alloys". Report by V.E.Ivanov, V.F.Zelensky, V.K.Khorenko, I.A.Petelgusov and others at the Salzburg Conference on problems of corrosion of reactor materials in 1962.

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of alloys.

4. Corrosion resistance of alloys in air and in commercial carbon dioxide under a pressure of 50 abs. at in the temperature range from 470 to 580°C, the testing time being approximately 14,000 hrs.

5. Resistance of alloys to short-time overheating in air and carbon dioxide media. Effect of chemical composition, condition of the surface and the rate of heating. The burning point of alloys.

6. Applicability of Mg-Be alloys for thin-walled protective jackets of wire-type fuel elements. Hermeticity of jackets and their alignment with cores. Permissible deformation of fuel elements. Effect of irradiation on protective properties of Mg-Be jackets.

7. Advantages of the alloys under consideration over magnesium-based alloys used in nuclear engineering. Prospects for use of the alloys.

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